

What is claimed is:

1. A method of fabricating a magnetic storage medium comprising:
  - forming an underlayer on a heat sink material;
  - co-sputtering a magnetic material and a thermally insulating nonmagnetic material to form a recording layer on the underlayer, wherein the recording layer includes grains of the magnetic material in a matrix of the thermally insulating nonmagnetic material; and
  - heating the recording layer to align an easy axis of magnetization of the magnetic material in a direction perpendicular to the underlayer.
2. The method of claim 1, wherein the underlayer has a (100) crystallographic texture orientation.
3. The method of claim 1, wherein the underlayer comprises a material selected from the group of: MgO, Ag, Ta, and Ru.
4. The method of claim 1, wherein the insulating material is selected from the group of: an oxide, carbon, boron, a carbide, and a nitride.
5. The method of claim 1, wherein the insulating material is selected from the group of: SiO<sub>2</sub>, ZrO<sub>2</sub>, TiO<sub>2</sub>, MgO, and MgO/SiO<sub>2</sub>.
6. The method of claim 1, wherein the heating step heats the recording layer to between 600°C and 700°C for a period of 1 to 5 minutes.
7. The method of claim 6, wherein the heating step transforms the magnetic material from a face centered cubic structure into a face centered tetragonal structure.
8. The method of claim 1, wherein the heating step is performed in a vacuum.
9. The method of claim 1, wherein the co-sputtering step is performed in a gas containing oxygen.
10. The method of claim 1, wherein the magnetically hard material comprises an L1<sub>0</sub> alloy including Pt and one of Fe and Co.
11. The method of claim 1, wherein the underlayer comprises a multilayer structure of: MgO\Ag, MgO\Ag\MgO, Ta\MgO\Ag, or Ta\MgO\Ag\MgO.

12. The method of claim 1, wherein the heat sink comprises a material selected from the group of: Cu, Au, Ag, and Al.

13. A magnetic storage medium fabricated according to the method of claim 1.

14. A magnetic storage medium comprising:  
an underlayer on a heat sink layer;

a recording layer on the underlayer, the recording layer including a magnetic material and a thermally insulating nonmagnetic material, wherein the recording layer includes grains of the magnetic material in a matrix of the thermally insulating nonmagnetic material; and

wherein the grains of the magnetic material have an easy axis of magnetization in a direction perpendicular to the underlayer.

15. The magnetic storage medium of claim 14, wherein the underlayer has a (100) crystallographic texture orientation.

16. The magnetic storage medium of claim 14, wherein the underlayer comprises a material selected from the group of: MgO, Ag, Ta, and Ru.

17. The magnetic storage medium of claim 14, wherein the insulating material is selected from the group of: an oxide, carbon, boron, a carbide, and a nitride.

18. The magnetic storage medium of claim 14, wherein the insulating material is selected from the group of: SiO<sub>2</sub>, ZrO<sub>2</sub>, TiO<sub>2</sub>, MgO, and MgO/SiO<sub>2</sub>.

19. The magnetic storage medium of claim 14, wherein the magnetically hard material comprises an L<sub>1</sub><sub>0</sub> alloy including Pt and one of Fe and Co.

20. The magnetic storage medium of claim 14, wherein the underlayer comprises a multilayer structure of: MgO\Ag, MgO\Ag\MgO, Ta\MgO\Ag, or Ta\MgO\Ag\MgO.

21. The magnetic storage medium of claim 14, wherein the heat sink comprises a material selected from the group of: Cu, Au, Ag, and Al.